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Daniel B. Ruble
Registration No. 40,794

DATE: February 11, 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Edlein et al	Group Art Unit:	1772
Serial No.:	09/657,679	Examiner:	M. Miggins
Filing Date:	September 8, 2000	Docket No.:	D-43378-01
Title:	PRINTED ANTIFOG FILM		

Commissioner for Patents
P.O. Box 1450
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Declaration of Milton Bowen under Rule 1.132

My name is Milton Bowen. I am an employee of Cryovac, Inc. the assignee of the above-referenced patent application. I am also a named inventor of this patent application.

I currently work as a Senior Development Specialist in Cryovac's Printing and Coating Technology Department in Simpsonville, South Carolina. I have worked in the printing industry for over 30 years. In 1986, Cryovac hired me, and I have since worked as a Cryovac employee for over twenty years in various fields of coating and printing flexible packaging films. Over this time, I have worked and developed expertise with technologies such as offset printing, rotogravure printing, flexographic printing, color matching, test methods development for ink performance evaluations, and print press operating conditions. I was also a training instructor for operators in the packaging printing department.

The following tests were conducted either by me or under my direction or request. The following abbreviations are used to represent the materials:

"AF Film 1" is a 0.6-mil thick, balanced five-layer, antifog film, having outer layers of a blend of ethylene/vinyl acetate and ethylene/α-olefin copolymers. Each of the outer layers of includes about 4% antifog agent comprising ethoxylated nonyphenol, so that the film

includes about 1.3 % antifog agent by weight of the total film. This film is available from Cryovac, Inc. under the trade name SES 320.

"AF Film 2" is a 1-mil thick, balanced five-layer, barrier antifog film, having outer layers of ethylene/α-olefin copolymers. Each of the outer layers of includes about 3 wt.% antifog agent comprising glycerol fatty acid ester and ethoxylated fatty alcohol, so that the film includes about 1.9 % antifog agent by weight of the total film. This film is available from Cryovac, Inc. under the trade name BDF 8050.

"AF Film 3" is a 0.75-mil thick, balanced five-layer, barrier antifog film, having outer layers of a blend of ethylene/vinyl acetate and ethylene/α-olefin copolymers. Each of the outer layers of includes about 4 wt.% antifog agent comprising glycerol fatty acid ester and propylene glycol, so that the film includes about 1.8 % antifog agent by weight of the total film. This film is available from Cryovac, Inc. under the trade name BDF 2060.

"Ink 1" is a solvent-based ink comprising a nitrocellulose/polyurethane blend resin available from Sun Chemical Corporation under the Solitaire Plus trade name. Ink 1 is believed to include wax and silicon as slip agent surface modifiers.

"Ink 2" is a solvent-based ink comprising a nitrocellulose/polyurethane blend resin available from the Siegwerk Corporation under the Seal Tec F11 trade name. Ink 2 is not believed to include any surface modifiers such as slip agents.

"OPV1" is an electron-beam curable acrylate overprint varnish available from Sun Chemical Corporation under the Sun 206 trade name.

The following method was used to prepare each of the samples. A primer was applied to one side of each film using a flexo hand proofer with an anilox roll count of 360 cells per inch and a rubber roll applicator. The viscosity of the primer was 18 seconds (#2 zahn cup). The primer was an ethylene vinyl acetate polymer (EVA) resin-based HAPS-free primer from Sun Chemical Corporation. The primer was then air dried.

A solvent-based ink was applied over the primer using the same hand proofer as above to form a printed image. The viscosity of the inks during application was from 30 to 35 seconds (#2 zahn cup). The ink was dried with a couple of passes of a hand held dryer.

Where indicated below, an electron-beam curable overprint varnish was applied over the printed image of each sample using the above described hand proofer.

If used, the electron-beam curable overprint varnish was cured under the following conditions: voltage 80 keV, dose setting: 20 kGy, beam current: 2.7 m Amp, conveyor speed: 50 feet/minute.

The resulting printed antifog film samples had a printed side and a non-printed side. The printed side of each film sample was placed against an equivalent film sample that was not printed. Each of these film pairs were then placed between the platens of a Grasby Specac hydraulic press having a 4-inch diameter platen and subjected to pressure (5,000 psig reading on the gauge of the hydraulic fluid) for 30 seconds at 38°C. This pressure was meant to simulate storage in a roll form.

The films were then separated. The antifog effectiveness of each sample was determined by assigning an Antifog Rating for the side of the unprinted film sample that had been compressed against the printed side of the corresponding printed film sample. The Antifog Rating was determined using the following method.

A numerical value ("Antifog Rating") was assigned to each sample by visually comparing the sample film, which had been exposed to controlled fogging conditions, to reference standards (see Figs. 1-5 of the present application) showing varying amounts and sizes of moisture condensate droplets on a film. The controlled fogging conditions were as follows. The sample film was secured over a mason jar that had about 10% of its internal volume filled with water at room temperature. The sealed jar was then placed in a refrigerator at 45°F (7°C).

After the specified amount of time, the exposed sample film was visually compared to the reference standards and assigned the Antifog Rating most closely resembling the appearance of the exposed sample film. "Half" numbers were assigned where it appeared that the sample was between two references (e.g., "3.5").

Five samples of each film were evaluated, and the results averaged and reported in Table 1 for the antifog effectiveness after 40 hours in the refrigerator.

An Antifog Rating of 1 is at the bottom of the scale, essentially lacking any antifog characteristics. An Antifog Rating of 5 indicates excellent antifog characteristics; and under the conditions of this experiment, indicates excellent anti-ghosting performance.

Table 1

	Film	Ink	Overprint Varnish	Antifog Rating @ 40 hours
Sample 1	AF Film 1	Ink 1	None	3.3
Example 1	AF Film 1	Ink 2	OPV1	4.5
Sample 2	AF Film 2	Ink 1	None	2.8
Example 2	AF Film 2	Ink 2	OPV1	4.3
Sample 3	AF Film 3	Ink 1	None	2.0
Example 3	AF Film 3	Ink 2	OPV1	4.8

The Samples 1, 2, and 3 films, which were compressed against the print side of film samples that had a solvent-based ink without an electron-beam cured overprint varnish, demonstrated significantly deteriorated antifogging characteristics, as shown by the Antifog Ratings of 3.3, 2.8, and 2.0, respectively. However, Examples 1, 2, and 3, which were compressed against the print side of film samples that included an electron-beam cured overprint varnish, showed a surprising and unexpectedly good performance and the lack of any significant deterioration of the antifog characteristics, as shown by the Antifog Ratings of 4.5, 4.3, and 4.8, respectively. This indicates that these Example systems would perform well to reduce the tendency of ghosting in the antifog film.

Another series of tests were conducted; however, the test method was different than that discussed above. The printed film was not an antifog film. Rather, in each of the samples in this series of tests, the ink system was printed on Film 4, which is not an antifog film. No primer was used. And rather than the printed side of each film sample being placed against an equivalent film sample that was not printed, the printed side of each of the Film 4 samples was placed against an unprinted AF Film 2 sample. These film pairs were then exposed to the pressure to simulate storage in a roll form as discussed above, and the Antifog Rating of the AF Film 2 determined, as discussed above.

Two samples of each film were evaluated, and the results averaged and reported in Table 2 for the antifog effectiveness after 40 hours in the refrigerator.

The following abbreviations (in addition to those above) are used below to report this second group of tests.

"Film 4" is a not an antifog film; it is a seven-layer barrier film having a thickness of about 2.7 mils and outer layers comprising ethylene/alpha-olefin copolymer.

"E-B 1" is an electron-beam curable ink available from Sun Chemical Corporation under the Wet Flex trade name.

"E-B 2" is a electron-beam curable white ink available from Sun Chemical Corporation under the Unicure trade name.

"Ink 3" is a solvent-based white ink comprising a nitrocellulose/polyurethane blend resin available from Sun Chemical Corporation under the Solitaire Plus trade name.

"Ink 4" is a solvent-based ink comprising a polyamide resin available from the Siegwerk Corporation under the AXL trade name.

Samples 5, 6 and 8 were made by first printing and drying the noted solvent-based ink, then applying and curing the electron-beam curable ink or overprint varnish, as noted in Table 2.

Table 2

	Ink System:	Antifog Rating @ 40 hours
Sample 4	Ink 1	3.3
Sample 5	E-B 1 over E-B 2	3.0**
Sample 6	E-B 1	4.3
Sample 7	E-B 1 over Ink 3	3.5
Sample 8*	OPV1 over Ink 4	2.0

*Sample 8 was made using printed-film that was over three-years old.

** This is the average of the actual values of 2.5 and 4.5.

I believe that the results presented in Table 2 may be unreliable for drawing conclusions as to the performance of the invention of the present invention because these samples failed to utilize a *printed, antifog* film, and the report used only 2 samples for each configuration.

The undersigned Declarant acknowledges that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon. All statements made of the Declarant's own knowledge are true. All statements made on information and belief are believed to be true.

MILTON BOWEN

Date: February 11, 2008